west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2349J
Plant ID No.:	097-00010
Applicant:	Mid-Atlantic Services, L.L.C.
Facility Name:	Alexander Compressor Station
Location:	Upshur County
SIC Code:	1311
NAICS Code:	211111
Application Type:	Modification
Received Date:	March 20, 2012
Engineer Assigned:	Jerry Williams, P.E.
Fee Amount:	$1,000.00
Date Received:	March 20, 2012
Complete Date:	April 30, 2012
Due Date:	July 29, 2012
Applicant Ad Date:	April 6, 2012
Newspaper:	*The Record Delta*
UTM's:	Easting: 570.1 km Northing: 4290.9 km Zone: 17
Description:	This permitting action is to remove one (1) 540 hp engine, remove the run time limitation on an engine, modify the fuel use on the engines and generator, revise the emissions from the glycol dehydration unit to reflect the most recent extended gas analysis, and add emissions from one (1) 100 bbl condensate tank, condensate truck loading and compressor blowdowns to the permit.

DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2349J:

The natural gas inlet stream from surrounding area wells enters the facility through an inlet suction separator prior to the gas being compressed. After the inlet gas passes through a compressor, it goes through the dehydration process before exiting the facility. The dehydration unit is used to remove water from the gas. In the dehydration process, gas passes through a contactor vessel where water is absorbed by the glycol. The "rich" glycol containing water goes

to the glycol reboiler where heat is used to boil off the water. The heat is supplied by a natural gas-fired reboiler that exhausts to the atmosphere. Overhead still column emissions will be controlled by a thermal oxidizer. A generator is present on site with a maximum use of 1,000 hours per year. Emissions from fugitive components also occur.

SITE INSPECTION

A site inspection was conducted in 2008 by Richard Fenton of the DAQ Enforcement Section. The facility was operating in compliance at that time.

Directions as given in the permit application are as follows:

From I-79, take Exit 99 and go east to Buckhannon. Take the Route 20 exit in Buckhannon and head south. Follow Route 20 south approximately 10 miles through French Creek. Turn left on Secondary Route 11 at the French Creek Game Farm and travel approximately 10 miles to the Y intersection and bear left. Go approximately 2 miles down hill and across the bridge at the bottom. The access road for the station is located at a sharp right hand turn 2.1 miles from the bridge.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this permit application consist of a fuel usage increase of three (3) engines and one (1) generator, revision of the emissions from the glycol dehydration unit to reflect the most recent extended gas analysis, and the addition of the emissions from one (1) 100 bbl condensate tank, condensate truck loading and blowdowns. In addition, one (1) 540 hp Ajax DPC-540 compressor engine was removed from operation, and the hourly limitation on the 540 hp Ajax DPC-540 compressor engine (EUMC2172) was removed.

The following table indicates which methodology was used in the emissions determination:

Emission Unit ID#	Process Equipment	Calculation Methodology
EUMC2172	540 hp Ajax DPC-540 Compressor Engine	Manufacturer's Data / EPA AP-42 Emission Factors
EUMC2009, EUMC3016	1,380 hp Waukesha L5794 GSI Compressor Engine with NSCR	Manufacturer's Data / EPA AP-42 Emission Factors
EUGEN-23	70 hp Caterpillar G35F3S Emergency Generator	Manufacturer's Data / EPA AP-42 Emission Factors
EUCTK1	100 bbl Condensate Storage Tank	EPA Tanks 4.09 Emission Estimation Software, Promax Process Simulation
EULOAD	Condensate Truck Loading	EPA AP-42 Emission Factors
EUDHY-1	30 mmscfd TEG Dehydration Unit	GRI-GlyCalc 4.0 Emission Estimation Software

EUDHY-1	0.75 MMBTU/hr TEG Reboiler	EPA AP-42 Emission Factors
APCTO	2.0 MMBTU/hr Thermal Oxidizer	Manufacturer's Data / EPA AP-42 Emission Factors

Fugitive emissions (EUFUG) and compressor blowdown (EUBD) emissions for the facility are based on calculation methodologies presented in the 2009 American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry. The factors presented in the API Compendium are for methane emissions. Therefore, the fugitive VOC and HAP emissions were calculated using a representative gas analysis and the weight percent of each respective pollutant.

The estimated emission calculations were performed by Mid-Atlantic Services, L.L.C. and checked for accuracy and completeness by the writer. The following tables include the emission source and the controlled emission rate associated with this modification:

Emission Point ID	Emission Unit ID	Process Unit	Pollutant	Maximum Controlled Emission Rate	
				Hourly (lb/hr)	Annual (ton/year)
EPMC2172	EUMC2172	540 hp Ajax DPC-540 Compressor Engine	Nitrogen Oxides	10.24	44.84
			Carbon Monoxide	1.55	6.78
			Sulfur Dioxide	0.01	0.01
			Particulate Matter-10	0.19	0.83
			Volatile Organic Compounds	1.67	7.30
			Formaldehyde	0.36	1.56
			Carbon Dioxide Equivalent	576.85	2,526.61
EPMC2009	EUMC2009	1,380 hp Waukesha L5794 Compressor Engine	Nitrogen Oxides	1.52	6.66
			Carbon Monoxide	1.73	7.60
			Sulfur Dioxide	0.01	0.03
			Particulate Matter-10	0.11	0.48
			Volatile Organic Compounds	0.91	4.00
			Formaldehyde	0.03	0.15
			Carbon Dioxide Equivalent	1,360.50	5,959.00
		1,380 hp Waukesha	Nitrogen Oxides	1.52	6.66
			Carbon Monoxide	1.73	7.60

EPMC3016	EUMC3016	L5794 Compressor Engine	Sulfur Dioxide	0.01	0.03
			Particulate Matter-10	0.11	0.48
			Volatile Organic Compounds	0.91	4.00
			Formaldehyde	0.03	0.15
			Carbon Dioxide Equivalent	1,360.50	5,959.00
EPGEN-23	EUGEN-23	70 hp Natural Gas Fired Generator	Nitrogen Oxides	1.37	0.68
			Carbon Monoxide	4.15	2.08
			Sulfur Dioxide	0.01	0.01
			Particulate Matter-10	0.01	0.01
			Volatile Organic Compounds	0.09	0.04
			Carbon Dioxide Equivalent	68.47	34.20
EPCTK1	EUCTK1	100 bbl Condensate Storage Tank	Volatile Organic Compounds	8.21	35.93
			Total Hazardous Air Pollutants	0.44	1.90
			Carbon Dioxide Equivalent	17.39	76.16
EPLOAD	EULOAD	Condensate Truck Loading	Volatile Organic Compounds	NA	0.44
			Total Hazardous Air Pollutants	NA	0.02
			Carbon Dioxide Equivalent	0.15	0.66
EUDHY1	EPSTL1	30 MMscfd Glycol Dehydrator Still Column	Volatile Organic Compounds	0.39	1.69
			Benzene	0.02	0.09
			Toluene	0.04	0.17
			Xylenes	0.13	0.58
			n-Hexane	0.01	0.05
			Carbon Dioxide Equivalent	4.19	18.36
EUDHY1	EPRBL1	0.75 mmBTU/hr Glycol Dehydrator Reboiler	Nitrogen Oxides	0.07	0.32
			Carbon Monoxide	0.06	0.27
			Sulfur Dioxide	0.01	0.01
			Particulate Matter-10	0.01	0.02
			Volatile Organic Compounds	0.01	0.02

			Carbon Dioxide Equivalent	87.75	384.36
APCTO	APCTO	Thermal Oxidizer	Nitrogen Oxides	0.40	1.74
			Carbon Monoxide	1.54	6.73
			Volatile Organic Compounds	0.04	0.18
			Sulfur Dioxide	0.01	0.01
			Particulate Matter-10	0.03	0.14
			Carbon Dioxide Equivalent	485.56	2,126.77
EPFUG	EUFUG	Fugitive Emissions	Volatile Organic Compounds	0.34	1.48
			Hazardous Air Pollutants	0.01	0.01
			Carbon Dioxide Equivalent	17.90	78.40
EPBD	EUBD	Compressor Blowdowns	Volatile Organic Compounds	NA	0.78
			Hazardous Air Pollutants	NA	0.02
			Carbon Dioxide Equivalent	NA	299.27

The emission changes associated with this application are shown in the following table:

Pollutant	Annual Emissions Before R13-2349J (tons/year)	Annual Emissions After R13-2349J (tons/year)	Emissions Change (tons/year)
Nitrogen Oxides	92.90	60.92	-31.98
Carbon Monoxide	36.05	31.04	-5.01
Volatile Organic Compounds	25.17	57.73	32.56
Particulate Matter-10	2.77	3.19	0.42
Sulfur Dioxide	0.21	0.09	-0.12
Formaldehyde	2.97	1.88	-1.09
Benzene	0.36	0.63	0.27
Toluene	0.38	0.72	0.34
Ethylbenzene	0.09	0.04	-0.05
Xylenes	1.12	0.79	-0.33
Total HAPs	7.93	6.52	-1.41
Carbon Dioxide Equivalent	NA	17,462.79	NA

The following table indicates the control device efficiencies that are being utilized:

Control Device ID	Emission Point ID	Control Device Description	Control Efficiency
APCTO	APCTO	Thermal Oxidizer	98% (VOC & HAPs)
NSCR	EPMC2009, EPMC3016	Non Selective Catalytic Reduction (NSCR)	NO_x – 95% CO – 90% CH_2O – 75%

REGULATORY APPLICABILITY

Applicable rules associated with this permit application are the following:

Unless otherwise stated WVDEP DAQ did not determine whether the permittee is subject to an area source air toxics standard requiring Generally Achievable Control Technology (GACT) promulgated after January 1, 2007 pursuant to 40 CFR 63, including the area source air toxics provisions of 40 CFR 63, Subpart HH and 40 CFR 63, Subpart ZZZZ.

The following rules apply to the facility:

45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

Mid-Atlantic Gas Services, L.L.C. would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

Any fuel burning unit having a heat input under ten (10) million B.T.U.'s per hour will be exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date. Therefore, the 0.75 mmBTU/hr reboiler (EPRBL1) would be exempt from these sections.

45CSR4 (To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors)

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

45CSR10 (To Prevent and Control Air Pollution from the Emission of Sulfur Oxides)

Mid-Atlantic Gas Services, L.L.C. would be subject to an in-stack sulfur dioxide concentration of 2,000 parts per million by volume.

Any fuel burning unit having a heat input under ten (10) million B.T.U.'s per hour will be exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date. Therefore, the 0.75 mmBTU/hr reboiler (EPRBL1) would be exempt from these sections.

45CSR13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

45CSR13 applies to this source due to the fact that the modification exceeds the regulatory emission threshold for criteria pollutants of 6 lb/hr and 10 ton/year for VOC emissions.

45CSR16 (Standards of Performance for New Stationary Sources Pursuant to 40 CFR Part 60)

45CSR16 applies to this source by reference of 40CFR60, Subpart JJJJ. Two (2) of Mid-Atlantic Gas Services, L.L.C.'s compressor engines are subject to 40CFR60 Subpart JJJJ subject to the recordkeeping, monitoring, and testing required by 40CFR60, Subpart JJJJ.

45CSR22 (Air Quality Management Fee Program)

Mid-Atlantic Gas Services, L.L.C. is not a major source of emissions and is not subject to 45CSR30. Therefore, they are a nonmajor source that is required to submit the appropriate fees listed in 45CSR22 and to keep their Certificate to Operate (CTO) current.

40CFR60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)

Two (2) of AMS's compressor engines are subject to 40CFR60 Subpart JJJJ, which sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine. 40CFR60 Subpart JJJJ is applicable to owners and operators of new stationary spark ignition internal combustion engines manufactured after July 1, 2007, for engines with a maximum rated power capacity greater than 500 hp. The standards for these engines (EPMC2009 and EMPC3016) are NO_x – 1.0 g/hp-hr (3.04 lb/hr); CO – 2.0 g/hp-hr (6.08 lb/hr); and VOC – 0.7 g/hp-hr (2.13 lb/hr).

Based on the manufacturer's specifications for these engines, the emission standards will be met.

Because these engines will not be certified by the manufacturer, AMS will be required to perform an initial performance test within 180 days from startup, and subsequent testing every 8,760 hours or 3 years, whichever comes first.

The following rules do not apply to the facility:

45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

45CSR19 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

Pollutant	**PSD (45CSR14) Threshold (tpy)**	**Alexander PTE (tpy)**	**45CSR14 Review Required?**
Carbon Monoxide	250	31.04	No
Nitrogen Oxides	250	60.92	No
Sulfur Dioxide	250	0.09	No
Particulate Matter 10	250	3.19	No
Ozone (VOC)	250	57.73	No
Greenhouse Gas (CO_2e)	100,000	17,462.79	No

As shown in the table above, Mid-Atlantic Gas Services, L.L.C. is not subject to 45CSR14 review.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) as seen in the table listed in the Regulatory Discussion Section.

SOURCE AGGREGATION DETERMINATION

"Building, structure, facility, or installation" is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Alexander Compressor Station is located in Upshur County and has an estimated capacity of 24 million cubic feet of gas per day (mmcfd). Alexander will be operated by Mid-Atlantic Gas Services, L.L.C., a midstream gathering company, who is partial owner and operator. Several different entities are involved in the production, gathering, and transmission of gas. The Operators are the parties who drill and operate the wells. The Shippers are the owners of the gas who may or may not be the same entity as the Operator. There are also parties who own and operate the gathering system pipelines and compression station, called Gatherers. In addition, there are parties that own and operate the gas processing plants.

1. The Alexander Compressor Station will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are compressor stations operated by Mid-Atlantic Gas Services, L.L.C. that share the same two-digit major SIC code of 13 for oil and gas exploration and production. Therefore, the Alexander Compressor Station does share the same SIC code as surrounding wells and gathering operations.

2. "Contiguous or Adjacent" determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this and whether or not it meets the common sense notion of a plant. The terms "contiguous" or "adjacent" are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; having a common endpoint or border.

   The closest well to the Alexander Compressor Station is approximately three (3) miles away, and the nearest compressor station is over four (4) miles away. Once operational, the Alexander Compressor Station will be able to gather gas from wells located approximately 25 miles away. Operations separated by these distances do not meet the common sense notion of a plant. Therefore, the properties in question are not considered to be on contiguous or adjacent property.

3. According to Mid-Atlantic Gas Services, L.L.C., none of the wells in the area are under common control with the Alexander Compressor Station. The ownership and control of the wells in the area are distinct for each well and not necessarily known by Mid-Atlantic Gas Services, L.L.C. The owners and operators of the wells make their own operational decisions about the wells independently and without any control by Mid-Atlantic Gas Services, L.L.C. Mid-Atlantic Gas Services, L.L.C. does not own or operate any wells in the area but does operate and control other compressor stations in the area. Furthermore, Alexander Compressor Station delivers gas to pipelines that are owned and operated by third parties. From this analysis, Mid-Atlantic Gas Services, L.L.C. is not under common control with other wells in the area. However, the Alexander Compressor Station is under common control with other Mid-Atlantic Gas Services, L.L.C. operations in the area.

Because the facilities are not considered to be on contiguous or adjacent properties, the emissions from the Alexander Compressor Station should not be aggregated with other facilities in determining major source or PSD status.

CHANGES TO PERMIT R13-2349I

This permitting action removes one (1) 540 hp Ajax DPC-540 compressor engine, removes the hourly limitation on the 540 hp Ajax DPC-540 compressor engine (EUMC2172), modifies the fuel use on the engines and generator, revises the emissions from the glycol dehydration unit to reflect the most recent extended gas analysis, and add emissions from one (1) 100 bbl condensate tank, condensate truck loading and blowdowns to the permit. In addition, carbon dioxide equivalent calculations were provided in this engineering evaluation/fact sheet to represent that this facility is not a major greenhouse gas (GHG) source.

MONITORING OF OPERATIONS

Mid-Atlantic Gas Services, L.L.C. will be required to perform the following monitoring:

1. Monitor and record quantity of natural gas consumed for all engines, and combustion sources.
2. Monitor all applicable requirements of 40CFR60 Subpart JJJJ.

Mid-Atlantic Gas Services, L.L.C. will be required to perform the following recordkeeping:

1. Maintain records of the amount of natural gas consumed in each combustion source.
2. Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
3. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
4. Maintain records of the visible emission opacity tests conducted per the permit.
5. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
6. The records shall be maintained on site or in a readily available off-site location maintained by Mid-Atlantic Gas Services, L.L.C. for a period of five (5) years.
7. Maintain records of all applicable requirements of 40CFR60 Subpart JJJJ.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates Mid-Atlantic Gas Services, L.L.C.'s Alexander Compressor Station meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Upshur County location should be granted a 45CSR13 modification permit for their facility.

_____

Jerry Williams, P.E.
Engineer

_____

Date